

REMARKS

Claims 1 through 48 remain pending in the present application. Claims 28 through 48 have been added. Newly presented Claims 28 through 48 cover the same patentable invention as Claims 1, 2, 4, 9, 11, 12, 15, 17, 19, 20, 21, 23, 25 through 29, 36 through 38 and 40 of U.S. Patent No. 6,549,001 B1 to Dobbs et al issued on April 15, 2003 and assigned to SKF USA Inc. of Elgin, Illinois. It is believed that an interference should be declared on the following proposed count:

COUNT I

A tone ring assembly for use on a rotatable machine part, said assembly including a rotatable tone ring able to generate a varying voltage output when rotating at varying speeds, with a fixed magnetic sensor assembly disposed in facing relation and closely spaced from said tone ring, said rotatable machine part including an axially inner portion and an axially outer portion running in a surrounding bearing unit, said tone ring comprising:

an axially extending main portion with a plurality of areas able to generate a voltage output upon rotation,

a retainer having at least one radial flange to prevent substantial axial movement of said tone ring,

said tone ring including plural axially extending ribs of reduced diameter on its inner diameter for snugly engaging a shaft,

and having axial spaces of enlarged diameter between said ribs, thereby affording passage for oil to pass axially through said tone ring assembly.

Applicants believe that Claims 1, 2, 4, 9, 11, 12, 15, 17, 19, 20, 21, 23, 25, 26, 27, 28, 29, 36, 37, 38, 40 of U.S. Patent No. 6, 549,001 and Claims 28 through 48 of the present application correspond to the proposed Count.

The terms of the application claims corresponding to the proposed Count are support in Applicants' specification as follows:

Terms in Claim	Supporting Language in Specification
Claim 1, lines 1 and 2: "A tone ring assembly for use on a rotatable machine part",	Page 6, paragraph 22, line 1 "With continued reference to Figure 2, exciter ring assembly 32 includes...."
Claim 1, lines 2, 3 and 4: "said assembly includes a rotatable tone ring able to generate a varying voltage output when rotated at varying speeds,"	Page 7, paragraph 25, lines 1 through 6, "when the exciter ring 28 is rotated near the variable reluctance sensor 18, the teeth 50 on the exciter ring 28 pass through magnetic lines of flux generated by a magnet in the sensor 18. As the teeth 50 are passed through the magnetic lines of flux, a voltage is generated in a coil within the sensor 18. The magnitude of the voltage is related to the speed and size of the exciter ring 50 in addition to design parameters within the sensor 18."
Claim 1, lines 4 and 5: "a fixed magnetic sensor assembly disposed in facing relation and closely spaced from said tone ring"	Page 6, paragraph 21, line 6, "sensor 18 is mounted to axle tube 22 in close proximity to exciter ring 28."
Claim 1, lines 5 and 6: "said rotatable machine part including an axially inner portion"	Page 6, paragraph 22, lines 4 and 5, "outer member 36 is pressfit into exciter ring axle bore 38 of axle tube 22."
Claim 1, lines 6 through 8: "and an axial outer portion running in a surrounding bearing unit"	Page 6, paragraph 21, lines 6 and 7, "axle 20 is rotatably supported and axle tube 22 by differential bearing 24 and wheel bearing 26."
Claim 1, lines 8 and 9: "said tone ring comprising an axially extending main body portion"	Page 6, paragraph 22, lines 1 and 2, "with continued reference to Figure 2, exciter ring assembly 32 includes

Terms in Claim	Supporting Language in Specification
	exciter ring 28 which is provided with lip 34.” Also see Figure 4 illustrating exciter ring 28.
Claim 1, lines 9 and 10: “a plurality of areas able to generate a voltage output upon rotation”	Page 7, paragraph 25, lines 2 through 4, “the teeth 50 on the exciter ring 28 pass through the magnetic lines of flux generated by a magnet in the sensor 18. As the teeth 50 are passed through the magnetic lines of flux a voltage is generated in a coil within the sensor 18.”
Claim 1, lines 10 through 12: “a retainer having at least one radial flange to prevent substantially axial movement of said tone ring”	Page 7, paragraph 26, lines 5 through 7, “exciter ring 28 is limited in its axial movement with respect to the sensor during installation due to interference between the outer ring 36 and first and secondly radially projecting annular surfaces 54,56 of the lip 34, as seen in Figure 4.”
Claim 1, lines 12 through 14: “said tone ring including plural axially extending ribs of reduced diameter on its inner diameter for snugly engaging a shaft”	Page 6, paragraph 23, lines 5 through 8, “an interior surface 46 of elastomeric insert 30 is interference fit with axial 20 to ensure that exciter ring 28 rotates with axle 20. In the embodiment shown, oil channels 44 formed in the interior surface of the elastomeric insert 30 to form interior surface 48 of the elastomeric insert 30 as seen in Figure 3.”
Claim 1, lines 14 through 16: “axial spaces of enlarged diameter between said ribs, thereby affording passages for oil to pass axially through said tone ring assembly”	Page 6, paragraph 23, lines 4 and 5, “elastomeric insert 30 has channels 44 that are provided to enable oil flow between elastomeric insert 20 and axle 20.”
Claim 2, lines 1 through 4: “said tone ring able to generate a voltage output by rotation comprising a tone ring body which includes a large plurality of axially extending lands and grooves therein.”	Page 7, paragraph 24, lines 1 through 4, “with continued reference to Figure 3, exciter ring 28 has teeth 50. Sensor 18, also shown in Figure 2, detects the presence or absence of teeth 50 as exciter ring 28 rotates around the axis of the axle 20. Preferred embodiment 55 teeth 50 are axially spaced around the circumference of the exciter ring 28.”
Claim 4, lines 1 through 3: “said	Page 6, paragraph 22, lines 1 through 3,

Terms in Claim

tone ring body includes a radial flange formed on the axially outer end thereof.”
Claim 9, lines 1 through 3: “said retainer includes a corrugated outer diameter whereby oil may pass axially along the outer diameter of the retainer.
Claim 11, lines 2 through 4: “said axially extending ribs on the inner diameter of said tone ring assembly have beveled end portions so as to facilitate installation over an associated axle shaft.”
Claim 12, lines 2 through 6: “further includes a spacer, lying in use between one end of said tone ring and one flange of said retainer, said spacer being made from a low friction material which is also resistant to noise making when in at least occasional contact with said tone ring.”
Claim 15, line 2: “said spacer is made from plastic material.”
Claim 17, lines 2 through 5: “further includes a low friction coating material on the axially outermost portion of said radial flange on said tone ring body.”
Claim 19, lines 2 and 3: “said spacer is discontinuous at its outer diameter to permit oil flow axially therethrough.”
Claim 20, lines 1 through 3: “at

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“with continued reference to Figure 2, exciter ring assembly 32 includes exciter ring 28 which is provided with lip 34.” This is also seen in Figure 4.
Page 8, paragraph 27, lines 1 and 2, “Figure 5 shows a preferred embodiment of the outer member 36 with circumferential recesses 58 formed along the axial length of the outer member 34. The recesses 58 enable oil flow pass the exciter ring assembly 30. Figure 6 shows an alternate embodiment of the outer member 36 with circumferential cutout 60 to permit oil flow pass the exciter ring assembly 32.”
This is seen at the bottom of Figure 4 adjacent the lead line for numeral 54.
Page 8, paragraph 26, lines 1 through 4, “with reference to Figure 4, exciter ring assembly 32 is shown in cross section along the axis of the axle 20. Exciter ring 28 is shown with lip 34 within outer member 36. Spacer 52 is shown adjacent to a first annular surface 54 of lip 34. Outer member 36 is shown to enclose lip 34 of exciter ring 28 and spacer 52.”
Figure 4 illustrates spacer 52 in cross section illustrated as a plastic material.
Page 8, paragraph 28, lines 4 through 6, “alternatively a coating may be added to the lip to act as a spacer. Additionally, the coating, like the spacer, acts to reduce noise.”
Page 8, paragraph 28, lines 1 and 2, “Figure 7 shows a preferred embodiment of the spacer 52. Outside aperture 62 enables oil flow through the exciter ring assembly.”
Page 6, paragraph 23, line 3, “preferably

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least said rib portion of said tone ring is elastomer that is a blend of NBR and EPDM.”	the insert is an elastomeric material.”
Claim 21, lines 2 through 4: “said ribs on said tone ring comprise at least one elastomer selected from the class consisting of NBR, HNBR, EPDM, AEM, and ACM.	Page 6, paragraph 23, line 3, “preferably the insert is of an elastomeric material.”
Claim 23, lines 2 and 3: “said ribs on said inner diameter of said tone ring are made from a thermoplastic thermoset material.”	Page 6, paragraph 23, line 3, “preferably the insert is an elastomeric material.”
Claim 25, lines 2 through 3: “said radial flange of said retainer includes cut-out portions to permit oil to pass therethrough.”	Page 8, paragraph 27, Figure 5 shows a preferred embodiment of the outer member 36 with circumferential recesses 58 formed along the axial length of the outer member 34. The recess 58 enable oil flow pass exciter ring assembly. Figure 6 shows an alternate embodiment of outer member 36 with circumferential cut-out 60 print oil flow pass the exciter ring assembly.
Claim 26, lines 2 and 3: “the body has, on the outer flange thereof, a stepped diameter.”	This is illustrated on Figure 4 adjacent the end of the lead line of numeral 56.
Claim 27, lines 2 through 5: “said tone ring further includes an air gap lying between radially opposed portions of said body and said radial flange for allowance of maximum axle shaft deflections without touching the flanges on said retainer.”	At the bottom of Figure 4, this is illustrated adjacent lead line numeral 56.
Claim 28, lines 1 through 4: “may have one associated axle shaft removed and either that axle shaft or another axle shaft installed into the original tone ring and retainer assembly.”	Page 6, paragraph 21, axle 20 is rotatably supported in axle tube 22 by differential bearings 24 and bearings 26.
Claim 29, lines 2 through 5: “said tone ring assembly being installed over an axle shaft and held in place by interference between said tone ring body and said flanges on said retainer during the entire	Page 6, paragraph 21, in the embodiment shown, exciter ring 28 is provided with an elastomeric insert 30 which is sized for an interference fit with axle 20.

Terms in Claim

sequence of installing the axle shaft.”
Claim 36, lines 1 and 2: “ A tone ring assembly for use on a rotatable machine part,
Claim 36, lines 2 through 5: “ said assembly including a rotatable tone ring able to generate a voltage output by rotation and a magnetic sensor assembly disposed in facing relation and closely spaced from said tone ring,”
Claim 36, lines 5 through 8: “ said rotatable machine part including an axially inner portion and an axially outer portion running in a surrounding bearing unit and with oil leakage being resisted by an oil seal,”
Claim 36, lines 8 and 9: “said tone ring comprising an axially extending main body portion,”
Claim 36, lines 9 and 10: “with a plurality of lands and grooves which generate a voltage output upon rotation,”

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Page 6, paragraph 22, line 1 “With continued reference to Figure 2, exciter ring assembly 32 includes...”
Page 7, paragraph 25, lines 1 through 6, “when the exciter ring 28 is rotated near the variable reluctance sensor 18, the teeth 50 on the exciter ring 28 pass through magnetic lines of flux generated by a magnet in the sensor 18. As the teeth 50 are passed through the magnetic lines of flux, a voltage is generated in a coil within the sensor 18. The magnitude of the voltage is related to the speed and size of the exciter ring 50 in addition to design parameters within the sensor 18.” Page 6, paragraph 21, line 6, “sensor 18 is mounted to axle tube 22 in close proximity to exciter ring 28.”
Page 6, paragraph 22, lines 4 and 5, “outer member 36 is pressfit into exciter ring axle bore 38 of axle tube 22.” Page 6, paragraph 21, lines 6 and 7, “axle 20 is rotatably supported and axle tube 22 by differential bearing 24 and wheel bearing 26.”
Page 6, paragraph 22, lines 1 and 2, “with continued reference to Figure 2, exciter ring assembly 32 includes exciter ring 28 which is provided with lip 34.” Also see Figure 4 illustrating exciter ring 28.
Page 7, paragraph 25, lines 2 through 4, “the teeth 50 on the exciter ring 28 pass through the magnetic lines of flux generated by a magnet in the sensor 18. As the teeth 50 are passed through the magnetic lines of flux a voltage is generated in a coil within the sensor 18.”

Terms in Claim

Claim 36, lines 10 and 11: "and a radially extending flange at one end of said tone ring,
Claim 36, lines 11 through 13: "a retainer having axially inner and outer radial flanges to prevent substantial axial movement of said tone ring,"
Claim 36, lines 13 through 15: "and a spacer lying between said radially extending flange on said tone ring and said axially outer radial flange of said retainer,"
Claim 36, lines 16 and 17: "said tone ring including a plural radially extending ribs on its inner diameter for snugly engaging a shaft,"
Claim 36, lines 17 through 19: "the spaces between said ribs affording passages for allowing oil to pass axially through said tone ring."
Claim 37, lines 2 through 4: "further includes a groove in said tone ring body lying between said flange and the remainder of said body, said groove receiving one of said axial flanges of said retainer and preventing axial movement of

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Page 6, paragraph 22, lines 1 through 3, "with continued reference to Figure 2, exciter ring assembly 32 includes exciter ring 28 which is provided with lip 34." This is also seen in Figure 4.
Page 7, paragraph 26, lines 5 through 7, "exciter ring 28 is limited in its axial movement with respect to the sensor during installation due to interference between the outer ring 36 and first and secondly radially projecting annular surfaces 54,56 of the lip 34, as seen in Figure 4."
Page 8, paragraph 26, lines 1 through 4, "with reference to Figure 4, exciter ring assembly 32 is shown in cross section along the axis of the axle 20. Exciter ring 28 is shown with lip 34 within outer member 36. Spacer 52 is shown adjacent to a first annular surface 54 of lip 34. Outer member 36 is shown to enclose lip 34 of exciter ring 28 and spacer 52."
Page 6, paragraph 23, lines 5 through 8, "an interior surface 46 of elastomeric insert 30 is interference fit with axial 20 to ensure that exciter ring 28 rotates with axle 20. In the embodiment shown, oil channels 44 formed in the interior surface of the elastomeric insert 30 to form interior surface 48 of the elastomeric insert 30 as seen in Figure 3."
Page 6, paragraph 23, lines 4 and 5, "elastomeric insert 30 has channels 44 that are provided to enable oil flow between elastomeric insert 20 and axle 20."
Figure 4 adjacent lead line to numeral 56.

Terms in Claim	Supporting Language in Specification
<p>said body.</p> <p>Claim 38, lines 2 through 7: “said body portion of said tone ring and said retainer are so sized that, upon installation of said retainer in the application counterbore, said body portion is supported by said retainer, and presents an opening in the inside diameter thereof that is able to be aligned without additional aid with an axle shaft which is to be inserted therethrough.”</p>	<p>Page 6, paragraph 22, lines 4 and 5, “outer member 36 is pressfit into exciter ring axle bore 38 of axle tube 22.”</p>
<p>Claim 40, lines 1 and 2: “A tone ring assembly for use on a rotatable machine part,”</p>	<p>Page 6, paragraph 22, line 1 “With continued reference to Figure 2, exciter ring assembly 32 includes....”</p>
<p>Claim 40, lines 2 through 5: “said assembly including a rotatable tone ring able to generate a voltage output by rotation and a magnetic sensor assembly disposed in facing relation and closely spaced from said tone ring,”</p>	<p>Page 7, paragraph 25, lines 1 through 6, “when the exciter ring 28 is rotated near the variable reluctance sensor 18, the teeth 50 on the exciter ring 28 pass through magnetic lines of flux generated by a magnet in the sensor 18. As the teeth 50 are passed through the magnetic lines of flux, a voltage is generated in a coil within the sensor 18. The magnitude of the voltage is related to the speed and size of the exciter ring 50 in addition to design parameters within the sensor 18.” Page 6, paragraph 21, line 6, “sensor 18 is mounted to axle tube 22 in close proximity to exciter ring 28.”</p>
<p>Claim 40, lines 5 through 8: “said rotatable machine part including an axially inner portion and an axially outer portion running in a surrounding bearing unit and with oil leakage being resisted by an oil seal,”</p>	<p>Page 6, paragraph 22, lines 4 and 5, “outer member 36 is pressfit into exciter ring axle bore 38 of axle tube 22.” Page 6, paragraph 21, lines 6 and 7, “axle 20 is rotatably supported and axle tube 22 by differential bearing 24 and wheel bearing 26.”</p>
<p>Claim 40, lines 8 and 9: “said tone ring comprising an axially extending main body portion”</p>	<p>Page 6, paragraph 22, lines 1 and 2, “with continued reference to Figure 2, exciter ring assembly 32 includes exciter ring 28 which is provided with lip 34.” Also see Figure 4 illustrating exciter ring 28.</p>

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Claim 40, lines 9 and 10: “with a plurality of lands and grooves able to generate a voltage output upon rotation,”

Claim 40, lines 10 and 11: “and a radially extending flange at one end of said tone ring,”

Claim 40, lines 11 through 13: “a retainer having axially inner and outer radial flanges to prevent substantial axial movement of said tone ring,”

Claim 40, lines 13 through 16: “said tone ring including means permitting passage of oil axially along said tone ring as well as means for engaging an axle shaft to locate said tone ring on said axle shaft,”

Claim 40, lines 16 through 19: “said engaging means allowing said axle shaft and said tone ring to become more strongly adherent when said tone ring is exposed to an oily condition.

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Page 7, paragraph 25, lines 2 through 4, “the teeth 50 on the exciter ring 28 pass through the magnetic lines of flux generated by a magnet in the sensor 18. As the teeth 50 are passed through the magnetic lines of flux a voltage is generated in a coil within the sensor 18.”

Page 6, paragraph 22, lines 1 through 3, “with continued reference to Figure 2, exciter ring assembly 32 includes exciter ring 28 which is provided with lip 34.” This is also seen in Figure 4.

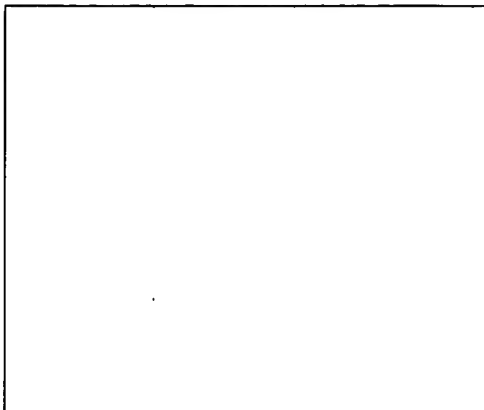
Page 7, paragraph 26, lines 5 through 7, “exciter ring 28 is limited in its axial movement with respect to the sensor during installation due to interference between the outer ring 36 and first and secondly radially projecting annular surfaces 54,56 of the lip 34, as seen in Figure 4.”

Page 6, paragraph 23, lines 4 and 5, “elastomeric insert 30 has channels 44 that are provided to enable oil flow between elastomeric insert 20 and axle 20.” Page 6, paragraph 23, lines 5 through 8, “an interior surface 46 of elastomeric insert 30 is interference fit with axial 20 to ensure that exciter ring 28 rotates with axle 20. In the embodiment shown, oil channels 44 formed in the interior surface of the elastomeric insert 30 to form interior surface 48 of the elastomeric insert 30 as seen in Figure 3.”

With reference to Figure. 3, exciter ring assembly 32 is shown in cross section perpendicular to the axis of axle 20. Exciter ring 28 has an inside surface 42 that is attached to elastomer insert 30. Preferably, the insert is of an elastomeric material. Elastomer insert 30 has channels 44 that are provided to enable oil flow between elastomer insert 30 and axle 20. An interior surface 46 of



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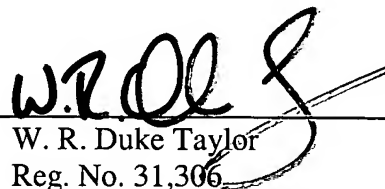
elastomer insert 30 is interference fit with axle 20 to ensure that exciter ring 28 rotates with axle 20. In the embodiment shown, oil channels 44 are formed in interior surface 46 of elastomer insert 30 to form interior surface 48 of elastomer insert 30. It is well known that after time oil further swells the elastomer increasing the strength of the interference fit.

The attached Affidavits of Applicants, as well as Elizabeth S. McGowan, Peter J. Murfey and Matthew S. Brown indicate that Applicants effective filing date is prior to the effective filing date of U.S. Patent No. 6,549,001. Also, the Affidavits prove that Applicants is prima facie entitled to a judgment relative to the patentee.

Applicants respectfully request that an interference be declared between the above identified U.S. patent application 10/085,743, and U.S. Patent No. 6,549,001.

Should the Examiner have any questions regarding the present Amendment, she should not hesitate to contact the undersigned at (248) 641-1600.

Respectfully submitted,

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Enclosures